

Status of Introduced Silverleaf Whitefly Parasitoids in Imperial Valley, California

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An intensive effort was made to establish biological control agents for silverleaf whitefly, *Bemisia tabaci* B strain (= *B. argentifolii*) in the desert Southwest from 1994 to 1999. Greenhouse-reared aphelinid parasitoids in the genera *Eretmocer* and *Encarsia* were released in large numbers (exceeding several million for many species) in commercial fields, refuge nursery plots, and urban yards by state, federal, and university scientists. This report examines exotic parasitoid establishment and relative abundance in two field plots and in the Imperial Valley communities of Brawley and El Centro. The two field plots were pesticide-free insectary garden plots (0.1-0.3 hectares each) located at the Imperial Valley Research Center.

In contrast to previous years, field plots did not contain a winter planting of either collard or sunflower. These winter-fallow plots were planted with two beds each of okra, basil, and cantaloupe, and four beds of cotton in March 2003. Samples (15 leaves per plant species per plot) were collected twice in the spring cantaloupe plantings (May and June) and four times from May to October for all other species. The parasitoid population from May through September consisted of over 90% *Eretmocer*. The parasitoid population consisted of approximately 70% *Eretmocer* species and 30% *Encarsia* by late October. *Encarsia sophia* represented 85% of the *Encarsia* collected, whereas 15% were *En. luteola* and *En. meritoria* combined. In total, 264 *Eretmocer* parasitoids were isolated for identification from the field plots, along with *Encarsia* species. Of the entire collection of *Eretmocer*, 99% of the male and 97% of the female *Eretmocer* sampled across all plant species were identified as introduced, exotic species (Figure 1).

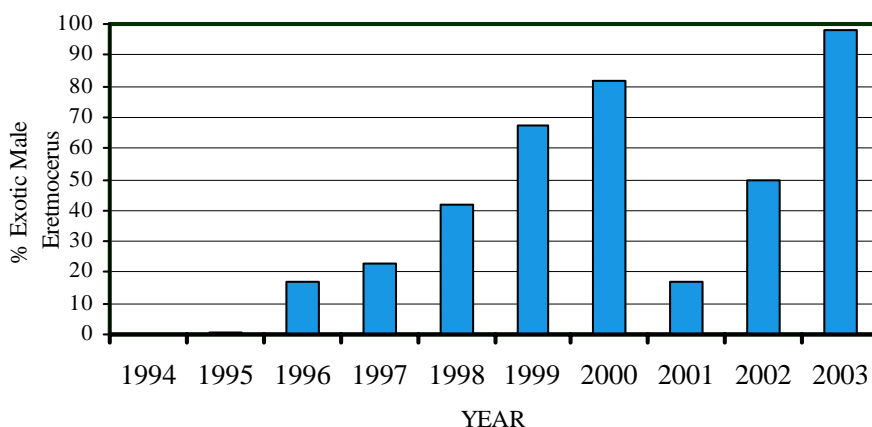


Figure 1. Establishment of silverleaf whitefly exotic parasitoids in the genus *Eretmocer* in field plots in Imperial Valley, California. No releases were made in study plots following 1997.

The sex ratio of the exotic *Eretmocer* was somewhat skewed with nearly 60% females. The dominance of exotic *Eretmocer* is especially noteworthy, given that the native species, *Er. eremicus*, is a commonly occurring biological control agent in the region, especially from mid-summer through fall.

Urban samples came from hibiscus plants in each community sampled on four dates from late July through early October. Results from this urban survey of hibiscus paralleled those obtained from the field plots. Of a total of 195 *Eretmocer* specimens, 97% of the males and 98% of the females were exotic species. The sex ratio was lower, with 48% of the population composed of females.

Species determination of exotic species is pending for the 2003 collection. Morphological identification (M. Rose) of *Eretmocer* collected in 2002 determined that the predominant species was *Eretmocer* sp. nr. *emiratus* (M96076 Ethiopia [48 specimens]). In addition, three specimens were *Er. emiratus* (M95104 United Arab Emirates) and three were *Er. mundus*. A number of specimens were not identifiable, but intermediate in form among these species. Polymerase chain reaction analysis of samples collected from 1997 to 2001 by the United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS) indicated that over 95% of the exotic *Eretmocer* have been *Er. sp. nr. emiratus* and *E. emiratus*. The predominant *Encarsia* species collected, *En. sophia* (M95107 Multan, Pakistan), was very common by mid to late summer in the field nursery plots during several of these years. In contrast, *En. sophia* was not common until October during 2003.

In summary, three species of exotic *Eretmocer* and one species of exotic *Encarsia* are established in Imperial Valley. Based on data collected in 2003, exotic *Eretmocer* sp. nr. *emiratus* from Ethiopia is the predominant species among parasitoids that attack the silverleaf whitefly. Data from the two field plots combined with data from two communities suggest that this is a regional phenomenon.